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Commissioner for Patents
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Sir:

This is a request for filing a continuation application under 37 C.F.R. 1.53(b) of pending prior application Serial No. 09/146,517, filed on September 3, 1998, entitled METHOD OF AND AN APPARATUS FOR CONTROLLING A WEB SERVER, A WEB SERVER CONTROL PROGRAM, AND A STORAGE MEDIUM ON WHICH THE WEB SERVER CONTROL PROGRAM IS STORED, by all of the inventors named in the prior application.

1. Enclosed is a copy of the prior application, including the Declaration as originally filed.
2. The Filing Fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION
LESS ANY CLAIMS CANCELED BY AMENDMENT BELOW
PLUS ANY CLAIMS ADDED BY ACCOMPANYING PRELIMINARY AMENDMENT

Basic Fee							\$	710.00
Total Claims	01	-	20	=	0	x	18	= \$ 0.00
Independent Claims	01	-	3	=	0	x	80	= \$ 0.00
Total Filing Fee							\$	710.00

3. A check including the amount of \$990.00 is enclosed to cover the Filing Fee and an Extension of Time Fee in the parent application.

4. Cancel claims 2-12 before calculating the Filing Fee.

5. The Commissioner is hereby authorized to charge any additional fees which may be required, or to credit any overpayment, to Deposit Account No. 50-1417. A duplicate copy of this Request is enclosed for this purpose.

6. Amend the specification by inserting, before the first line:

--This is a continuation application of U.S. Serial No. 09/146,517, filed September 3, 1998.--.

7. New drawings are enclosed, fourteen (14) sheets, Figs. 1-21.

8. The power of attorney is set forth in the Declaration in the prior application or an associate power of attorney is hereby granted to:

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9. The prior application is assigned to Hitachi, Ltd.


10. Priority of the following Japanese patent applications is claimed under 35 U.S.C. § 119:

No. 9-240852 filed September 5, 1997.

The certified priority documents have been filed in prior application Serial No. 09/146,517.

The undersigned hereby declares and verifies that the enclosed application is a true copy of the latest signed prior application Serial No. 09/146,517, as originally filed on September 3, 1998, and no amendment referred to in the declaration filed to complete the prior application introduced new matter into the prior application.

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.


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Date: November 20, 2000

ASA-734
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United States Patent Application

Title of the Invention

A METHOD OF AND AN APPARATUS FOR CONTROLLING
A WEB SERVER, A WEB SERVER CONTROL PROGRAM, AND
A STORAGE MEDIUM ON WHICH THE WEB SERVER
CONTROL PROGRAM IS STORED

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0974544.4.0000

A METHOD OF AND AN APPARATUS FOR CONTROLLING A WEB SERVER,
A WEB SERVER CONTROL PROGRAM, AND A STORAGE
MEDIUM ON WHICH THE WEB SERVER CONTROL PROGRAM IS STORED

BACKGROUND OF THE INVENTION

The present invention relates to a method of
controlling a WEB server, the method being applied to a
video data distributing system using retrieval functions of
5 the WEB.

Protocols utilized on the Internet are
comprehensively called World Wide Web (WWW) and servers
which transmit information by use of the WWW are called WEB
servers. Since WEB servers are operating worldwide, users
10 capable of accessing the Internet can acquire information
from such WEB servers. Information available to the users
include primarily texts, still pictures, audio data, and
video data of a low bit rate less than or equal to about
100 kilobits per second (Kb/s).

15 Additionally, there have been conducted business
activities through the Internet, for example, a system in
which each user accesses a WEB server, selects articles or
goods to buy the selected articles on credit using his or
her credit card. An example of the system has been
20 described in page 47 of the "Nikkei Multimedia" published
from Nikkei BP (Vol. 1997. 1, No. 19).

To use the Internet, it is usually necessary for the user to subscribe to an Internet service provider. Thereafter, the user accesses the Internet service provider via a communication line to communicate with the Internet
5 through the provider.

Attention has been attracted to the video-on-demand (VOD) service in which users can watch video data at any desired point of time. When a user desires a VOD service from a terminal device, the user first accesses the
10 VOD server after powering the terminal device and then presents a list of available video data on its display. The user selects, for example, a genre or group of video data to watch so as to finally select one title of video data and then issues a request for the video data to the
15 VOD server. In response to the request, the VOD server sends the required video data to the user. An example of the VOD server has been described in an article "Video On Demand" in pages 110 and 111 of the "Nikkei Multimedia" published from Nikkei BP (Vol. 1997. 2, No. 20).

20 The Digital Audio Visual Council (DAVIC) stipulating standardization of bi-directional multimedia network services has determined a protocol to distribute digital audio/visual data. The DAVIC published "DAVIC 1.2 Specification" in December 1996. In the Specification,
25 Part 12 "Configuration 4 scenario characteristics" (Chapter 9.19 in pages 83 to 147) describes a stipulation which makes it possible to access WEB servers via the Internet

from a terminal device using the VOD for a network having a high throughput.

SUMMARY OF THE INVENTION

When a user requests video data related to
5 information on a page of WEB server, the video data is distributed from the WEB server in the conventional method. However, it is difficult to obtain in a realtime manner the video data via the Internet at a high bit rate equal to or more than several megabits per second (Mb/s) for the
10 following reasons. That is, it is not the first object of the WEB servers to transmit video data. Moreover, the network throughput is limited in the Internet. Therefore, it is difficult to receive by the terminal device high-quality video data related to WEB information. In
15 consequence, the transfer rate of video data is to be lowered or the user cannot view the video data in the realtime manner. Namely, the video data is once downloaded on a disk of the terminal device to be reproduced at original rate later by the terminal device.

20 In accordance with DAVIC, the access to the Internet and that to the VOD server are completely independent of each other and there exists no stipulation concerning VOD server information to be kept by the WEB servers. Consequently, there is no way to obtain video
25 data related to WEB server information from a VOD server connected to another network.

invention to enable the user who receives information from a WEB server to obtain video data related to the information from a VOD server other than the WEB server.

5 For each operation to retrieve video data, the user does not select any item from a menu for the VOD server, namely, the video data can be immediately retrieved in a state in which the information of the WEB server is being checked or inspected.

10 To achieve the object above in accordance with the present invention, information on VOD server addresses from which the terminal device can receive video data and information on identifiers of video data requested from the terminal device are beforehand kept in the WEB server.

15 Moreover, when a request of display of WEB page including
buttons for retrieving video data is received, the WEB
server retrieves an address of a VOD server necessary for
the terminal device to receive the distributed video data
and an identifier of the video data and then transfers
20 these items to the terminal device. Alternatively, on
receiving a request of distribution of video data from the
terminal device, the WEB server retrieves an address of a
VOD server necessary for the terminal device to receive the
distributed video data and an identifier of the video data
25 and then transfers these items to the terminal device.
Alternatively, on receiving a request of distribution of
video data from the terminal device, the WEB server
transfers a client unit of VOD system kept therein to the

terminal device and then the WEB server retrieves an address of a VOD server necessary for the terminal device to receive the distributed video data and an identifier of the video data and then transfers these items to the
5 terminal device.

With this provision, when retrieving video data regarding the inspected WEB page, the terminal device receives the address identifying the VOD server and the identifier indicating the video data and hence it is
10 possible to immediately obtain the video data from the VOD server.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects and features of the present invention will become more apparent from the consideration of the
15 following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a block diagram showing a network environment in a first embodiment in accordance with the present invention;

20 Fig. 2 is a diagram showing constitution of a WEB server 5000 in the first embodiment;

Fig. 3 is a PAD flowchart showing a processing procedure of a control unit for HTTP scripts 5520 in the first embodiment;

25 Fig. 4 is a diagram showing a WEB page displayed and contents of description of HTML files in the first embodiment;

in a main memory 1500a of a terminal 1000 in the second embodiment;

Fig. 16 is a diagram showing structure of a WEB server 5000 in a third embodiment;

5 Fig. 17 is a PAD flowchart showing a processing
procedure of a control unit for HTTP scripts 5520b in the
third embodiment;

Fig. 18 is a diagram showing a WEB page displayed
and contents of description of HTML files in the third
10 embodiment;

Fig. 19 is a diagram showing program units loaded in a main memory 1500b of the terminal 1000 in the third embodiment;

Fig. 20 is a diagram showing a table of
15 identifiers of video data 5620b in the third embodiment;
and

Fig. 21 is a diagram showing a list of VM codes
5680.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 Description will be given of a first embodiment
in accordance with the present invention.

Fig. 1 shows a network environment to which a method of controlling WEB servers of the present invention is applied. In Fig. 1, terminal devices 1000 and 2000 are connected to a local area network (LAN) 3000 and are capable of accessing a VOD server 4000 and a WEB server 5000 via the LAN 3000.

It is assumed that a manager beforehand stores in the WEB server 5000 information on VOD server addresses and a list of video data in the VOD server. The terminal device 1000 issues a request to the WEB server 5000 for a

5 WEB page 7001 to resultantly acquire the WEB page 7001. When buttons for retrieving video data 7003 are associated with the WEB page 7001, the WEB server 5000 describes in an HTML file defining a WEB page a VOD server 4000 in which video data is stored and an identifier of video data in the

10 VOD server 400 and then transfers the WEB page therefrom. When the user selects the buttons for retrieving video data on the WEB page from the terminal device, a request for video data is transferred to the VOD server 4000 through the HTTP protocol. In accordance therewith, the VOD server

15 4000 distributes the video data to the terminal. The video data is expanded by the terminal device to be audio-visually enjoyed by the user. The HTTP protocol has been described in pages 588 to 602 of the "Netscape FastTrack Server" written by Robert P. Lipshutz and John Garriss,

20 Translated into Japanese by Toshihiro Takeuchi, and published from Gijutsu-Hyoro-Sha in 1997.

Assume, for example, that an application of an electronic shopping is running on the WEB server 5000. A user views a WEB page of the electronic shopping on a

25 terminal device. In the WEB page, there is provided a button to display video data related to the shopping. When the user selects the button, the terminal device transmits a request for video data to the VOD server 4000 through the

HTTP protocol. In accordance therewith, the VOD server 4000 distributes the video data to the terminal device.

Consequently, by selecting the buttons for retrieving video data 7003 displayed on the WEB page 7001, the user can issue a request for video data to the VOD server 4000 without giving special attention thereto to thereby audio-visually enjoy the video data.

Fig. 2 shows the construction of the WEB server 5000 of the present invention. The WEB server 5000 includes a display 5100, a keyboard 5200, a central processing unit (CPU) 5300, a network device 5400, a main memory 5500, a magnetic disk 5600, a bus 5700. Loaded in the main memory 5500 are an input unit of information of server 5510, a control unit for HTTP server, and an HTTP server 5530. On the magnetic disk 5600, there are stored a table 5610 of addresses of VOD server 4000, a table of identifier of video data 5620, Hypertext Markup Language (HTML) files for lists of video data 5630, and HTML files 5640.

The display 5100, the keyboard 5200, the network device 5400, the main memory 5500, and the magnetic disk 5600 are accessed by the CPU 5300 via the bus 5700. The network device 5600 supervises communication of data with the LAN 3000. On receiving a request issued by a user from a terminal device for information through the HTTP protocol, the HTTP server 5530 selects a necessary HTML file from the HTML files and sends the file to the terminal device. The input unit of information on server is a

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be activated by the HTTP server 5530 when necessary. In this embodiment, the CGI unit is used to create a new HTML file. The creating procedure has been described in pages 93 to 122 of the "A Guide to CGI" written by Eric Herrmann, translated into Japanese by Teiko Kuno and Yasushi Kuno, an published from Prentice Hall in 1997.

Subsequently, the processing procedure of the control unit for HTTP server 5520 will be described by referring to the PAD flowchart of Fig. 3. On receiving an activation request from the HTTP server 5530 (step 6002), the unit 5520 receive an IP address of the terminal device .1000 from the HTTP server 5530. First, the address conversion unit 5521 starts its operation to convert the IP address into a network address (step 6003). Since the network address is stipulated by the Internet Engineering Task Force (IETF) providing standardization of protocols on the Internet, the conversion is achieved in accordance with rules (RFC790 of IETF). The rules will be briefly described below.

Assume that an IP address of a terminal device is expressed by a 32-bit binary number. When the upper-most bit of the number is zero, the bits up to 23rd bit of the IP address represent a network address. When the upper-most bit of the number is one, the bits up to 15th bit of the IP address represent a network address. Moreover, when two upper-most bits are "11", the bits up to 7th bit thereof indicate a network address. According to this

algorithm, an IP address is converted into a network address.

Next, a unit of searching video servers 5522 initiates operation thereof. Using the table of addresses of VOD servers 5610 indicated by the network address temporarily stored in the buffer 5525, the unit 5522 reads an address of a VOD server 4000 to distribute video data to the terminal device and then stores the address in the buffer 5525. Thereafter, the unit 5522 reads again the address of the VOD server 4000 from the buffer 5525 and receives from the HTTP server 5530 a name of video data selected by the terminal device 1000 to obtain an identifier of the video data in the VOD server 4000 in accordance with the table of identifiers of video data for VOD server 5620. As a result, there is obtained the identifier of the video data.

The address of the VOD server 4000 and the identifier of the necessary title in the VOD server are described in the URL format, for example,

20 server1.network1/dir1/dir2/name1 .

where, server1.network1 specifies a VOD server and dir1/dir2/name1 indicates a name of video data configured and managed in a hierarchic fashion. The control unit for HTTP server 5520 describes the information in the HTML files

25 5640. The generated HTML file is sent by the HTTP server 5530 to the terminal device.

The WEB page 7001 sent to the terminal device in this operation includes a part of information 7002 and a

part of buttons for retrieving video data 7003 as shown in Fig. 4. The HTML file 7004 includes, in association with the contents of the page, a part of description of information 7005 and a part of description 7006 of a

5 location of a page to be next referred to when the buttons for retrieving video data are selected. This is described, for example, as follows.

Thanks to this description, when the buttons for
10 retrieving video data are selected, the HTTP server can transmits to the terminal device the WEB page 7001 including the address of the VOD server 4000 and the identifier of video data.

Fig. 5 shows an example of the table of addresses
15 of VOD servers 5610. The table 5610 is used by the unit of searching video servers 5522 to retrieve an address of VOD server in accordance with a network address of a terminal device. Each record of the table 5610 includes a network address 5611 of a terminal device 1000 and an address of
20 VOD server 5612 with a correspondence established therebetween. The address of the VOD server 4000 is an address of a server which can distributes video data to a terminal device having the network address. It is assumed that the manager of the WEB server 500 beforehand stores
25 pertinent data in the table 5610 so that the data is accessed for reference in step 6005 of the control unit for HTTP server 5520.

In the storage example of Fig. 5, a network address "102.100.0.0" corresponds to an address of VOD server 400 "server3.network3". Therefore, in step 6005 of the control unit for HTTP server 5520, it is possible to
5 read the address "server3.network3" of the VOD server 4000 to distribute video data to the terminal device having the network address "102.100.0.0".

Fig. 6 shows the table of identifiers of video data 5620, which is used by the unit of searching video
10 servers to read information on an identifier of video data in the VOD server 4000. The table 5620 includes a field for name of video data 5621. In this example, in association with video data, there are stored identifiers of video data 5622 to 5624 respectively stored in the VOD
15 servers 1 to 3. Also in this table 5620, the manager of the WEB server 5000 stores pertinent data in advance such that the data is utilized in step 6006 of the control unit for HTTP server 5520 to read an identifier of video data stored in the VOD server.

20 For example, an identifier of the name of video data "shoes_1" stored in the VOD server 4000 having the address "server1.network1" is obtained as dir1/dir2/name1. Consequently, in step 6006 of the control unit for HTTP server 5520, using the VOD server indicated by the address
25 of VOD server read from the buffer and the video data read from the buffer, the video data identifier "dir1/dir2/name1" is read from the table of identifiers of video data 5620. Additionally, a mark of "x" indicates absence of

video data in Fig. 6. Namely, video data of "wear_3" is absent for VOD server 1.

Fig. 7 shows the structure of the terminal device. The device includes a display 1100, a keyboard 1200, a mouse 1300, a CPU 1400, a memory 1500, a video decoder 1600, a network device 1700, and a bus 1800.

The display 1100, the keyboard 1200, the network device 1700, and the main memory 1500 are accessed from the CPU 1400 via the bus 1800. The network device 1700 communicates data with an LAN 3000.

Operating the keyboard 1200 and the mouse 1300, the user issues a request to the WEB server 5000 for a WEB page 7001. A WEB browser 1520 in the memory first issues a request to the WEB server 5000 through the HTTP protocol. 15 Receiving an HTML script from the WEB server 5000, the WEB browser 1520 presents the page on the display 1100. When the buttons for retrieving video data 7003 are present, there exists information on VOD servers added as an attribute by the WEB server. Therefore, when the user 20 selects the buttons 7003, an access is made to the HTTP server on the VOD server 4000 through the HTTP protocol. In accordance therewith, the video data is received from the VOD server 4000 in a realtime fashion. While expanding the video data by the video decoder, the terminal presents 25 the video data on its display.

The VOD server 4000 of Fig. 1 receives a request for distribution of video data through the HTTP protocol. As an example of the VOD server of this kind, there has

been known a VOD server called "RealVideo". This server has been described "RealVideo Capable Of Sending Video Data To One Million People" written in pages 68 and 69 of the "Nikkei Multimedia" published from Nikkei BP (Vol. 1997. 8, No. 26).

Finally, description will be given of an example of the user interface screen to input information on VOD server to the WEB server 5000. Fig. 8 shows a screen image to create a table of addresses of VOD servers 5610. As already described, a network address of a terminal device can be derived from an IP address thereof. A network address of the terminal device is inputted to a field 7110 and an address of a VOD server which can be accessed from the terminal device is inputted to a field 7120. For easy understanding in the operation later, a name of the VOD server is inputted to a field 7130.

Fig. 9 shows an example of a screen image displaying a list of VOD servers inputted as above. Selecting one of the VOD servers therefrom, the user can display a screen image to input identifiers of video data, which will be described later. Fig. 9 includes a button 7220 for the scrolling of displayed image when a large number of servers are to be displayed and an area 7210 in which the button 7220 moves.

Fig. 10 shows a screen image in which a new name of video data is inputted. When new video data is stored in the VOD server 4000, a name of the video data is inputted in a field 7310.

Fig. 11 shows a screen image to input the table of identifies of video data 5620. This diagram includes an area 7430 in which a list of names of video data is displayed and an area in which identifiers of video data possessed by the VOD server selected from the area 7230 of Fig. 9 are inputted. In this example, "VOD server 2" is selected from the area 7230 of Fig. 9. In the area 7440, "none" is displayed in each field thereof. When the VOD server 4000 has video data, the manager inputs identifiers thereof in this area. Fig. 11 further includes a button 7420 for the scrolling of displayed images when a large number of video data are displayed and an area 7410 in which the button 7420 moves. When items are appropriately inputted in this screen image, there is constructed the table of addresses of VOD servers 5610.

As above, using the WEB server 5000 of the present invention, the user can issues a request for video data to a VOD server capable of conducting VOD distribution immediately after selecting the buttons for retrieving video data on a WEB page displayed on the terminal device 1000. Consequently, the terminal device 1000 can obtain video data with a higher quality from the VOD server.

Next, description will be given of a second embodiment to which the present invention is applied.

In the second embodiment, like the first embodiment, information on addresses of VOD servers and information on identifiers of video data are stored in the

WEB server 5000. Differing from the first embodiment in which information on identifiers of the VOD server 4000 and video data are simultaneously transmitted when the menu screen of video data is transferred from Web server 5000 to the terminal device, the information on identifiers of the VOD server 4000 and video data are transferred to the terminal 1000 when the terminal device issues a request for video data in the menu of video data in the second embodiment.

10 The embodiment is implemented in a network environment similar to that shown in Fig. 1. In the WEB server 5000, the manager beforehand stores information on addresses of VOD server 4000 and a list of video data in the VOD server 4000. The terminal device 1000 has, in addition to the WEB browser 1520, a client unit of VOD system 1530 to reproduce data of video data distributed from the VOD server 4000. When there are buttons for retrieving video data in the WEB page, the WEB server 5000 creates a file in which an address of a VOD server from which the terminal device can receive distributed video data and an identifier of the video data. When the user selects the buttons for retrieving video data in the WEB page from the terminal device 1000, the WEB server 5000 issues a request to activate the client unit of VOD system 1530 on the terminal device 1000 and transfers the file including information on VOD servers to the WEB browser 1520. In accordance with the information, the WEB browser

1520 immediately issues a request to the VOD server 4000
for video data to thereby obtain the video data.

The structure of the WEB server 5000 of this embodiment differs from that of the WEB server 5000 of the first embodiment in the main memory 5500 and the magnetic disk 5600. As can be seen from Fig. 12, in the main memory 5500a of this embodiment, the control unit for HTTP server 5520a does not include the unit of creating HTML scripts 5524 and includes a unit of creating server information 5526 in place thereof. Additionally included on the magnetic disk 5600a are files of information on servers 5650. The control unit for HTTP server 5520 is implemented, like in the first embodiment, as a CGI program or unit which is activated in response to a request from the HTTP server 5530.

Referring to Fig. 13, description will be given of the processing procedure of the control unit for HTTP server 5520a. When compared with the first embodiment, steps 6003 to 6005 are kept unchanged. In this embodiment, the unit of creating server information is activated after an address of the VOD server and an identifier of video data are obtained (step 6010). These information items are then written in the files of information on servers 5650.

In addition, a description indicated by a numeral
25 7007 in Fig. 14 is stored in a page to be transferred to
the terminal device 1000.

```
<EMBED SCR=VodServerAddressFile>
```

where, `VodServerAddressFile` indicates the files of

information on servers 5650.

This instruction is issued via the HTTP server 5530 to the WEB browser 1520 in the terminal device 1000 to activate a helper application, which will be described later. When the client unit of VOD system 1530 is beforehand registered as a helper application, the WEB browser 1520 can activate the client unit 1530 when the buttons for retrieving video data 7003 are selected. Additionally, the instruction can order the HTTP server to simultaneously transfer the file of information on servers 5650 to the terminal device. With the information, the terminal device 1000 can request the VOD server 4000 to send video data to the client unit 1530.

Apart from the first embodiment, the address of
15 the VOD server and the identifiers of video data of the
second embodiment is not necessarily described in the URL
format.

Fig. 15 shows the layout of the memory 1500 of the terminal device 1000. This embodiment differs from the first embodiment in that there is additionally provided the client unit of VOD system 1530. For the WEB browser 1520, the client unit 1530 is beforehand registered as a helper application. A helper application is an application which can be activated by an order from the WEB server 5000 independently of the WEB browser 1520. When the buttons for retrieving video data 7003 of Fig. 14 are selected, the instruction to activate the helper application is transferred from the HTTP server 5530 to the WEB browser

1520 and then the WEB browser 1520 accordingly activates
the client unit of VOD system 1530. Furthermore, the files
of information on servers 5650 in which an address of the
VOD server 4000 and identifiers of video data are written
5 is transmitted from the WEB server 5000. When activated,
the client unit 1530 reads the files of information on
servers 5650 and accesses the VOD server 4000 in accordance
therewith to reproduce the video data. An actual example
of the procedure in which the client unit 1530 accesses the
10 VOD server 4000 to thereby reproduce the video data has
been described in pages 110 to 115 of an article "Video On
Demand" written in the "Nikkei Multimedia" published from
Nikkei BP (Vol. 1997. 2, No. 20, 1997)..

As described above, when the user selects the
15 buttons for retrieving video data 7003 on the WEB page 7001
displayed on the terminal device 1000 in this embodiment,
it is also possible to immediately issue a request for
video data to a VOD server capable of distribute the video
data. Therefore, the terminal device can obtain video data
20 with a higher quality from the VOD server 4000.

Next, description will be given a third
embodiment in accordance with the present invention.

In the third embodiment, as in the second
embodiment, information on addresses of VOD servers and
25 information of identifiers of video data are stored in the
WEB server 5000. In the second embodiment, when the
terminal device 1000 requests video data selected from the
menu of video data, the information on identifications of

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simultaneously received, the terminal device 1000 accesses the VOD server 4000 to request video data.

The construction of the WEB server 5000 of the embodiment varies from that of the first embodiment in the main memory 5500 and the magnetic disk 5600. As shown in Fig. 16, the main memory 5500b of this embodiment does not include the unit of creating HTML scripts 5524 and includes in place thereof a unit of creating HTML scripts for downloading VM codes 5527. Additionally included on the magnetic disk 5600b are files of HTML scripts for downloading VM codes 5660 and the client unit of VOD system 5670.

The processing procedure of the control unit for HTTP server 5520b will be described by referring to Fig. 17. This unit 5520b is also implemented by a CGI unit or program as in the first embodiment. On receiving a request for display of the WEB page 7001 including buttons for retrieving video data 7003, the HTTP server 5530 initiates an instruction to activate the CGI unit. The control unit for HTTP server 5520b carries out an activating operation in accordance with the CGI activating instruction (step 6002) and then obtains an IP address of the terminal device as in the first embodiment to obtain an address of the VOD server in accordance with the IP address. The control unit 5520b then stores the name of video data and an address of the VOD server in the buffer 5525 (steps 6003 to 6005). Thereafter, in step 6012, the control unit 5520b activates the unit of creating HTML scripts for downloading VM codes,

reads the address of VOD server and the name of video data from the buffer 5525, and reads an identifier of video data, a protocol, and a method of compressing video data from the table of identifiers of video data 5620b.

5 In this configuration, the table 5620b is a table in which identifiers of video data which can be distributed from the respective VOD servers are kept as shown in Fig. 20. Furthermore, the table 5620b keeps therein protocols to distribute video data and methods of compressing video data. In the example of Fig. 20, for example, video data "shoes 1" kept in the VOD server 1 is associated with an identifier of 101, a protocol of TCP, and a video data compression method of MPEG1.

Return to description of the procedure or step 6012 of Fig. 17. The control unit for HTTP server 5520b writes in the files of HTML scripts for downloading VM codes 5660 the address of VOD server read from the buffer 5525 and the identifier of video data obtained from the table of identifiers of video data 5620b with a
15
20 correspondence established therebetween.

In step 6013 of Fig. 17, in accordance with the protocol for distributing video data and the method of compressing video data obtained from the table 5620b, the control unit 5520b selects VM codes necessary to reproduce
25 the video data by use of a list of VM codes 5680 to set the VM codes to the HTML files for lists of video data 5630. In this embodiment, the list of VM codes 5680 is a table to keep therein VM codes serving as a client unit of VOD

system corresponding to a protocol and a method of
compression. For example, when the protocol is "UDP" and
the compression method is "MPEG1", the table indicates
that "VodAppl" is required to be employed as the client
5 unit of VOD system.

By referring to Fig. 17, description has been
given of the procedure in which the unit of creating
scripts of VM codes 5527 reads the name of video data and
the IP address of the terminal device to create the files
10 of HTML scripts for downloading VM codes 5660 and the HTML
files for lists of video data 5630. Depending on the
environment of the VOD server to which the terminal device
belongs, the network throughput is limited, and
accordingly, it is necessary to change the protocol
15 available for the distribution of video data from the VOD
server and the method of compressing the video data. The
control unit for HTTP server 5520b can select VM codes in
association with the protocol and the compression method
and hence advantageously minimized the size of VM codes to
20 be downloaded onto the terminal device.

Subsequently, description will be given of a
method of describing the files of HTML scripts for
downloading VM codes 5660 and the HTML files for lists of
video data 5630. In the WEB page 7001 of Fig. 18, there is
25 disposed an area 7008 corresponding to the buttons for
retrieving video data 7003, the area 7008 including
description of an instruction used to download VM codes

when the buttons for retrieving video data 7003 are selected. The description is as follows.

where, VMDownloadFile indicates the files of HTML scripts

5 for downloading VM codes 5640.

In the specified files, there are described as initial values of the client unit of VOD system the addresses of VOD servers and descriptors of video data in addition to download instructions. When JAVA is selected for the VM codes, the files are described as follows.

```
<APPLET CODE="VodApp.class"WIDTH=300 HEIGHT=200>
```

```
.<PARAM NAME="VodServerAddress"VALUE="10001">
```

```
<PARAM NAME="TitleID" VALUE="101">
```

The first line is an instruction to download and activate
15 program file (VodApp.class) of the client unit of VOD
system 5660. The second and third lines indicate an
instruction to incorporate address "10001" of the VOD
server and identifier "101" of the video data in the
program during the downloading phase. The downloading
20 method of JAVA has been described in pages 263 to 266 of
the "Guide to HTML3.2" written by Sachi and published from
Libros in 1997.

Differing from the first embodiment, the address of VOD servers and identifiers of video data of this
25 embodiment are not necessarily described in the URL format.

The memory 1500b of the terminal device varies from that of the second embodiment in that there is added a virtual machine 1540 as shown in Fig. 19. The user first

In this embodiment as described above, when the buttons for retrieving video data are selected on the WEB page 7001 displayed on the terminal device 1000, a request for video data can be immediately issued to the VOD server 4000 capable of distributing video data. Therefore, the terminal device can obtain video data with a higher quality from the VOD server 4000.

In accordance with the present invention, the user who is accessing the WEB server can immediately issue a request for highly precise video data associated with information obtained from the WEB server to a video server

different from the WEB server so as to audio-visually enjoy the video data.

While the present invention has been described with reference to the particular illustrative embodiments, it is not to be restricted by those embodiments but only by
5 the appended claims. It is to be appreciated that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the present invention.

CLAIMS:

1. A WEB server control method for use with a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in response to a distribution request from the terminal, video data via a network; and a WEB server for managing video server information including an address of the video server and information on identifiers of video data, comprising the steps of:

receiving a request from the terminal for a display of a page; and

transferring to the terminal, when the page includes indication of a display of video data, a network address of a video server and information on identifiers of video data, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

2. A WEB server control method for use with a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in response to a distribution request from the terminal, video data via a network; and a WEB server for managing video server information including an address of the video server and information on identifiers of video data, comprising the steps of:

receiving a request from the terminal for a display of video data; and

3. A WEB server control method for use with a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in response to a distribution request from the terminal, video data via a network; and a WEB server for managing video server information including an address of the video server and information on identifiers of video data, comprising the steps of:

transferring a network address of a video server and information on identifiers of video data to the terminal together with a video data display program unit for displaying video data corresponding to the information on identifiers of video data, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

4. A WEB server for use with a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in response to a distribution request from the terminal, video data via a network; and a

a server information distributing means for transferring a network address of a video server and information on identifiers of video data to the terminal, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

server information distributing means for transferring a network address of a video server and information on identifiers of video data to the terminal together with a video data display program unit for displaying video data corresponding to the information on identifiers of video data, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

7. A WEB server control program unit for controlling a WEB server in a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in response to a distribution request from the terminal, video data via a network; and a WEB server for managing video server information including an address of the video server and information on identifiers of video data, comprising the following steps of:

transferring to the terminal, when the page includes indication of a display of video data, a network address of a video server and information on identifiers of video data, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

receiving a request from the terminal for a display of video data; and

transferring a network address of a video server and information on identifiers of video data to the terminal, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

9. A WEB server control program unit for controlling a WEB server in a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in

receiving a request from the terminal for a display of a page; and

11. A computer-readable storage medium for storing therein a WEB server control program unit for controlling a WEB server in a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in response to a distribution request from the terminal, video data via a network; and a WEB server for managing video server information including an address of the video server and information on identifiers of video data, wherein the program unit includes the steps of:

transferring a network address of a video server and information on identifiers of video data to the terminal, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

12. A computer-readable storage medium for storing therein a WEB server control program unit for controlling a WEB server in a video data distributing system including a terminal device having a WEB browser and a function to display video data, a video server for distributing, in

transferring a network address of a video server and information on identifiers of video data to the terminal together with a video data display program unit for displaying video data corresponding to the information on identifiers of video data, the address and the information being used for distribution of video data from a video server as a predetermined distributing source of video data.

A WEB server includes a control unit for HTTP server, a table of addresses of VOD servers, and a table of identifiers of video data. The control unit accesses these tables, in response to a request from a user of a terminal device for a display of video data, to retrieve therefrom an address of a video server and an identifier of a title of video data related to information on a WEB page accessed by the user and then transfers the address and the identifier to the terminal device. This enables the user of a video-on-demand system to easily obtain video data associated with information on the WEB server.

FIG.1

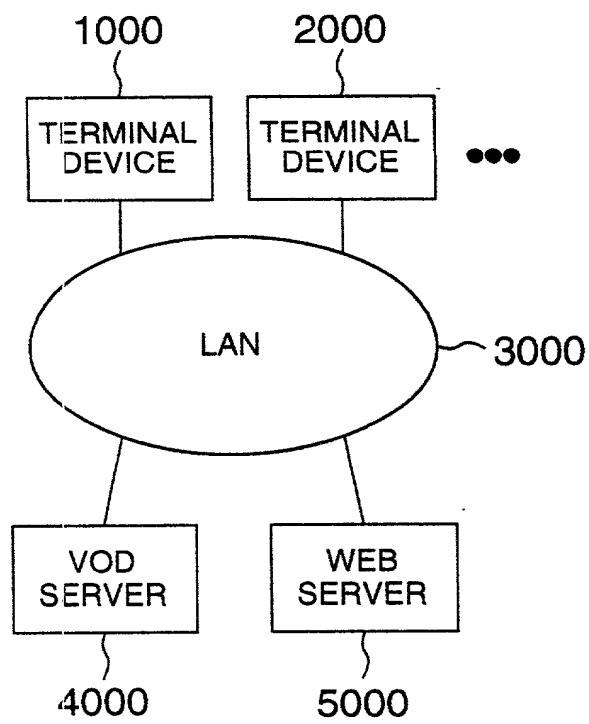


FIG.2

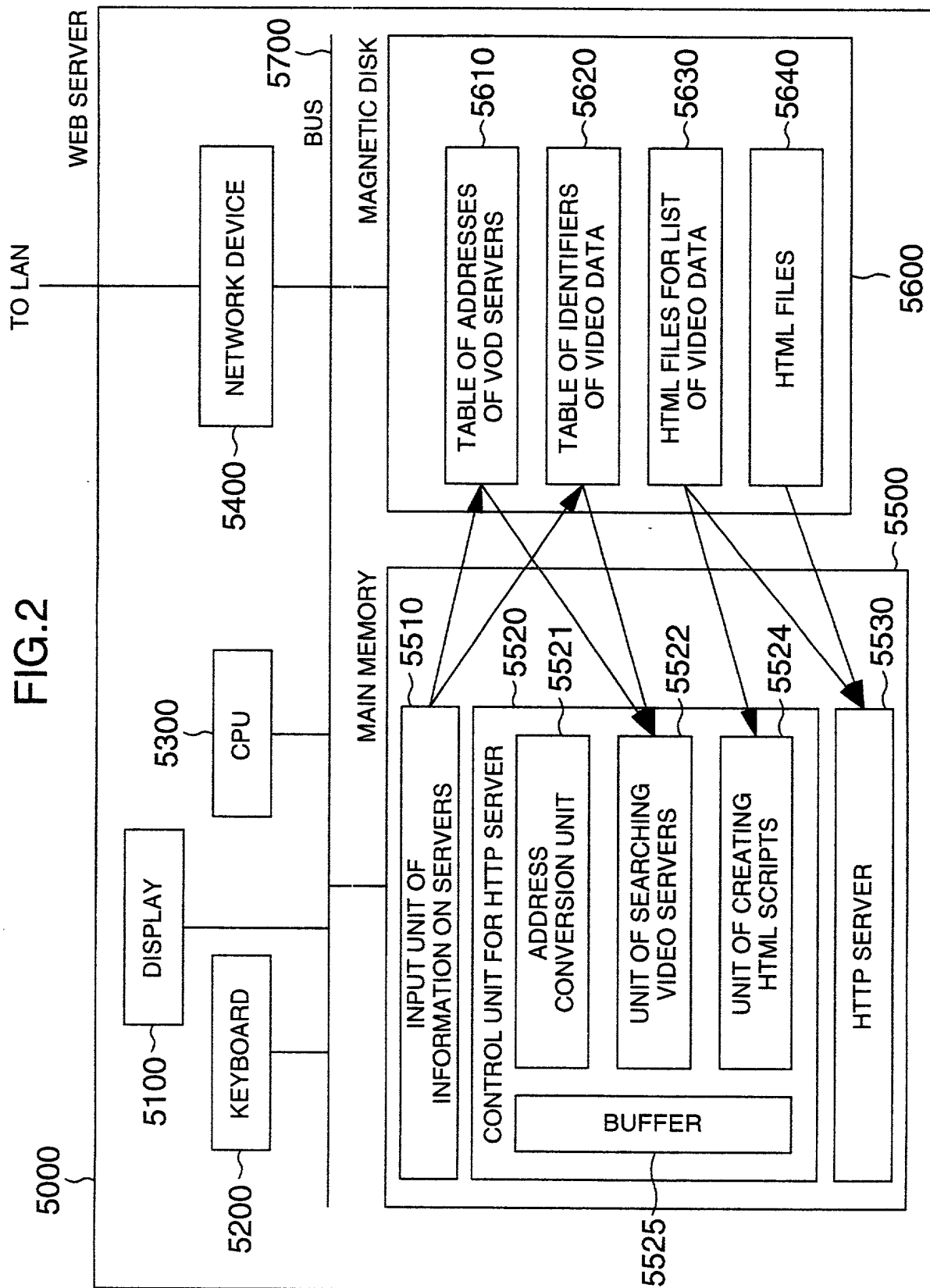


FIG.3

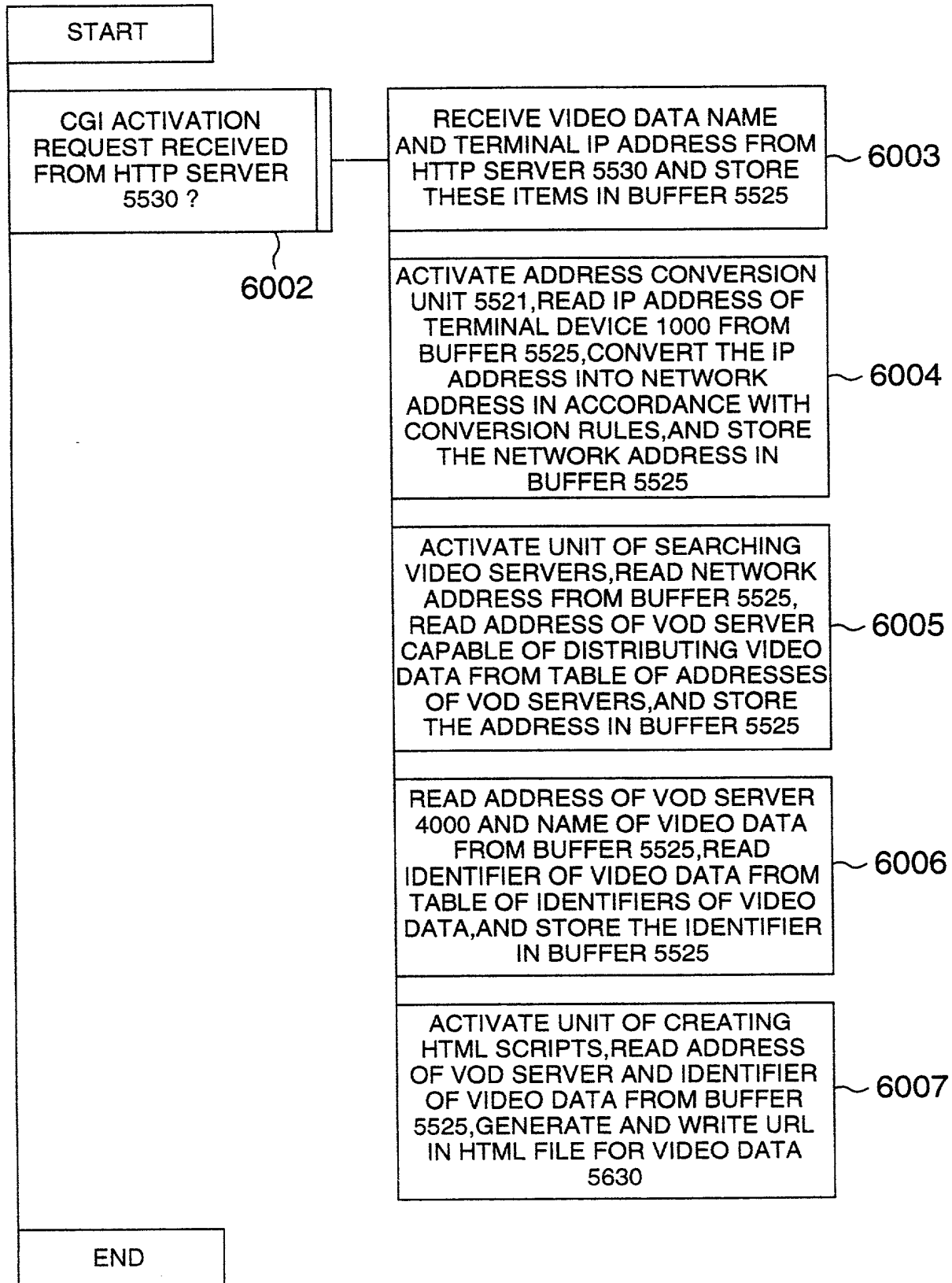


FIG.4

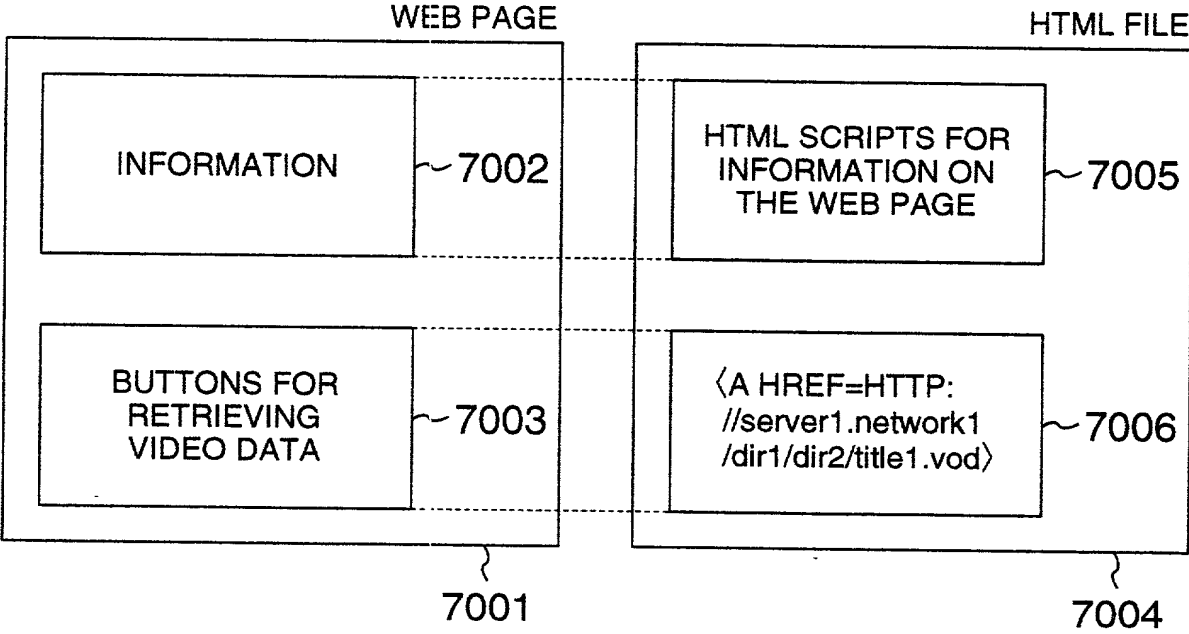


FIG.5

ADDRESSES OF TERMINAL DEVICES	VOD SERVER ADDRESSES IN VOD NETWORK
100.100.0.0	server1. network1
101.100.0.0	server2. network2
102.100.0.0	server3. network3
103.100.0.0	server4. network4
104.100.0.0	server5. network5
105.100.0.0	server6. network6
⋮	⋮

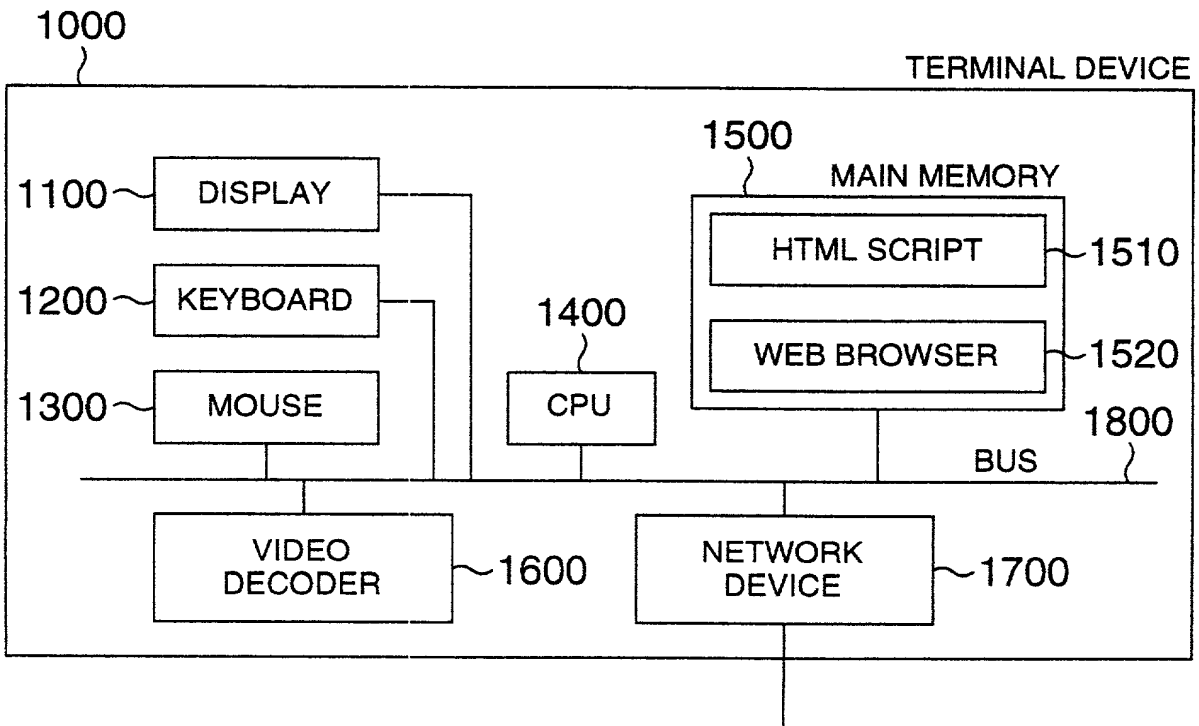
5611 5612 5610

FIG.6

INFORMATION ON VOD SERVER ADDRESSES					
NAMES OF VOD SERVERS		VOD SERVER No.1	VOD SERVER No.2	VOD SERVER No.3	...
ADDRESSES OF VOD SERVERS		server1. network1	server2. network2	server3. network3	
NAME OF VIDEO DATA	SHOES_1	dir1/dir2/ name1	dir5/dir6/ name3	dir9/dir10/ name5	
	CAP_2	dir3/dir4/ name2	×	dir11/dir12/ name6	
	WEAR_3	×	dir7/dir8/ name4	dir13/dir14/ name7	
	⋮				

5621
5622
5623
5624
5620

FIG.7



[illegible][illegible]

FIG.10

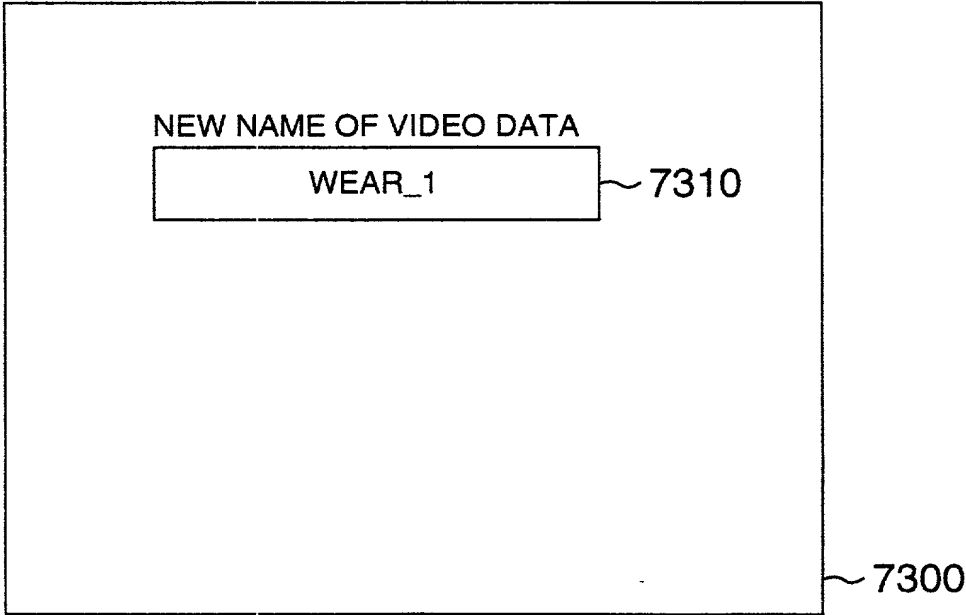


FIG.11

LIST OF VIDEO DATA		LIST OF IDENTIFIERS OF VIDEO DATA ON VOD SERVER No.2	
SHOES_1	101	<div>7420</div>	7400
CAP_2	102		
WEAR_1	(NONE)		
7430		7440	7410

FIG.12

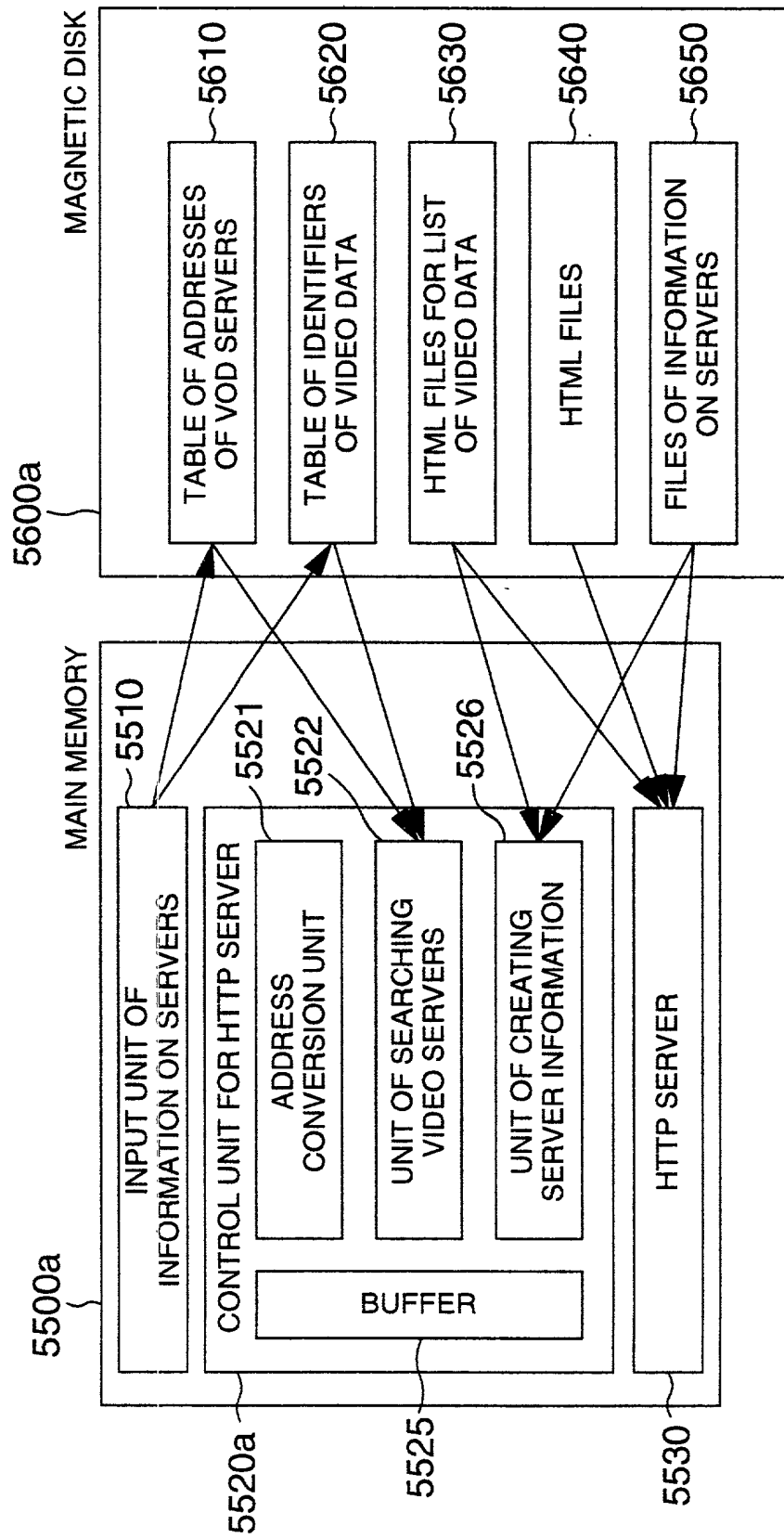


FIG.13

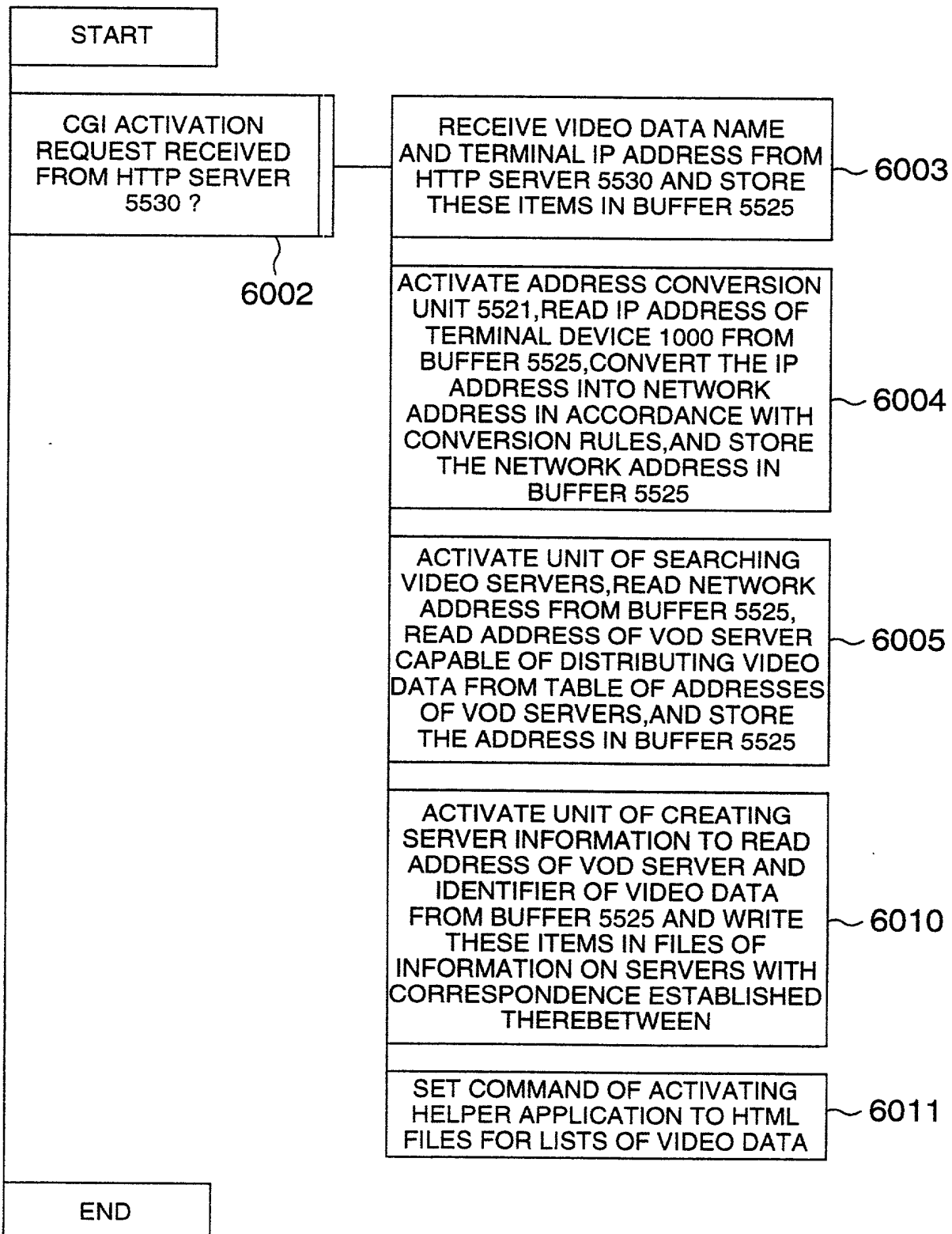


FIG.14

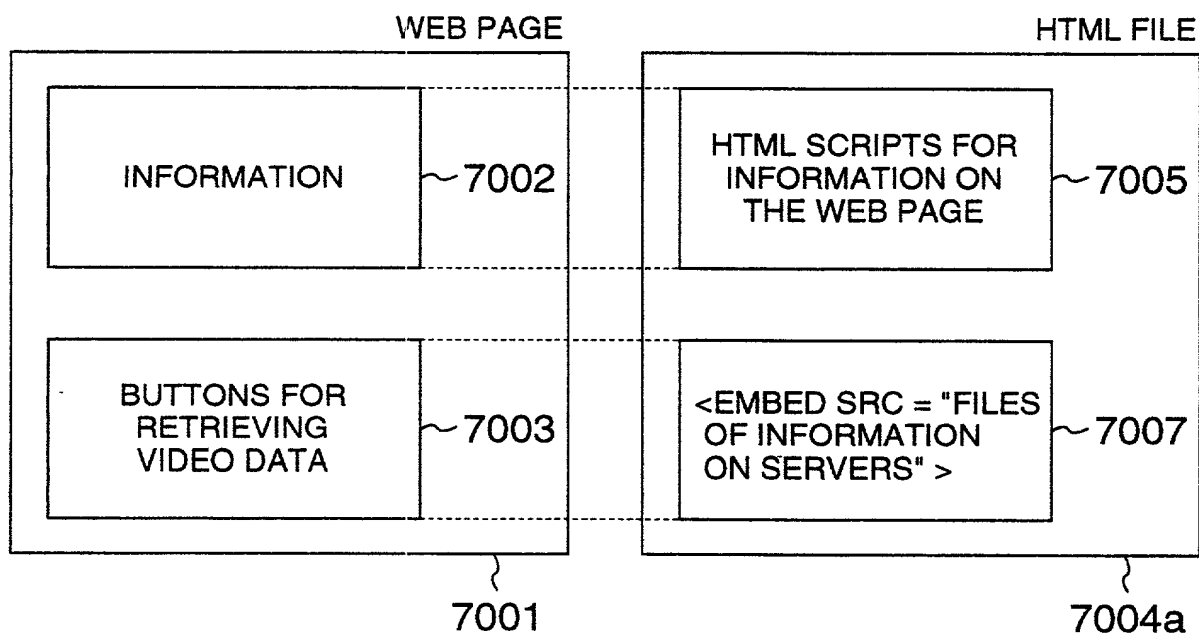


FIG.15

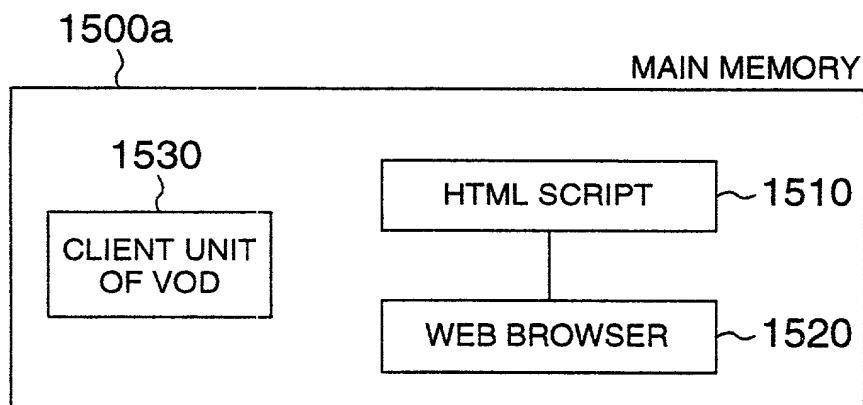


FIG.16

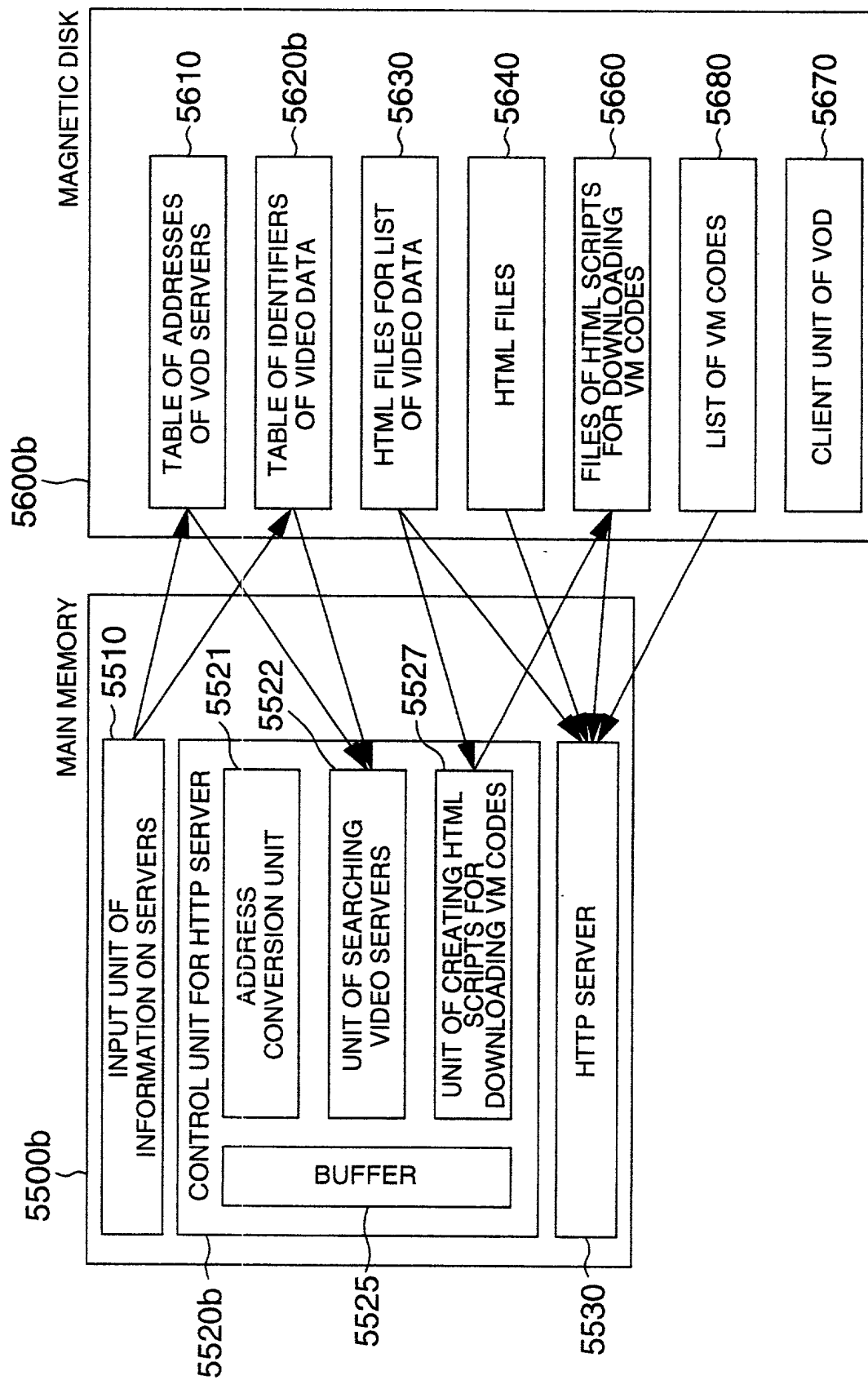


FIG.17

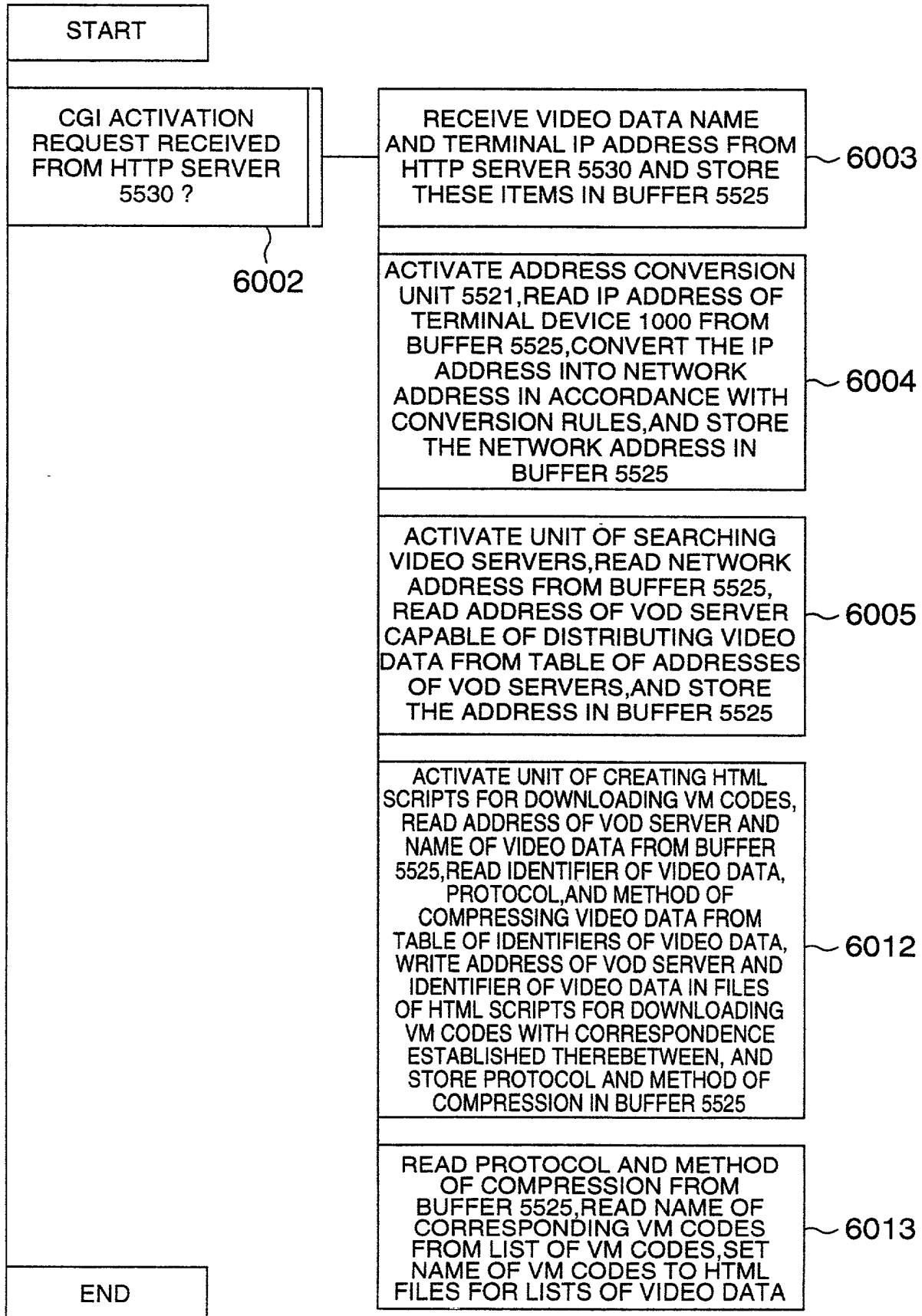


FIG.18

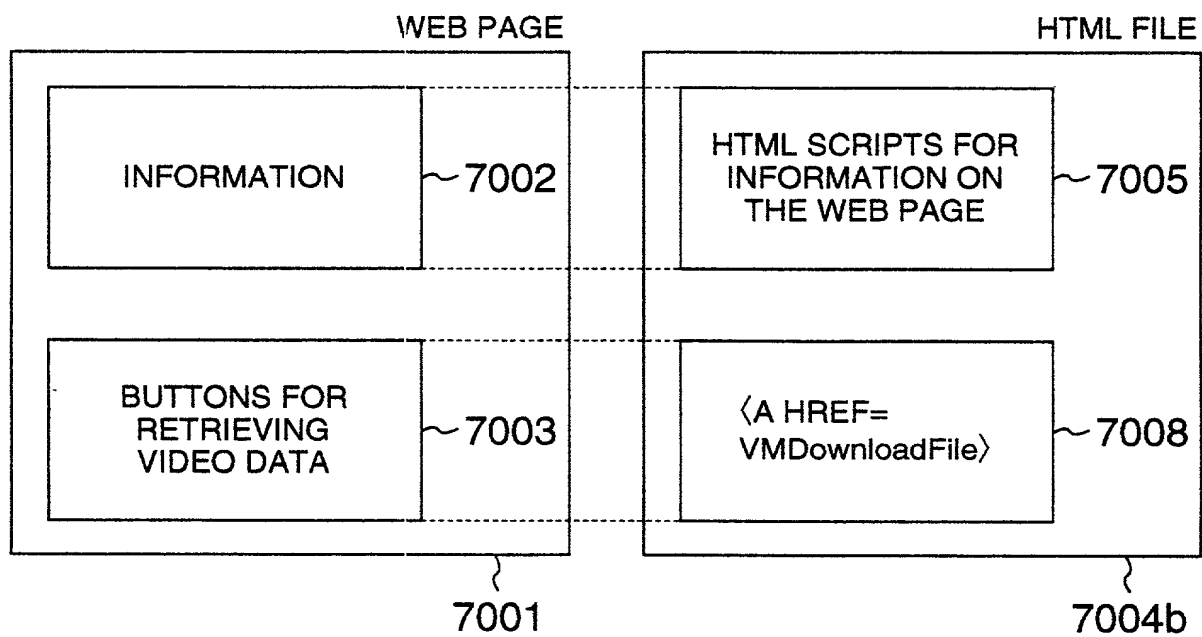


FIG.19

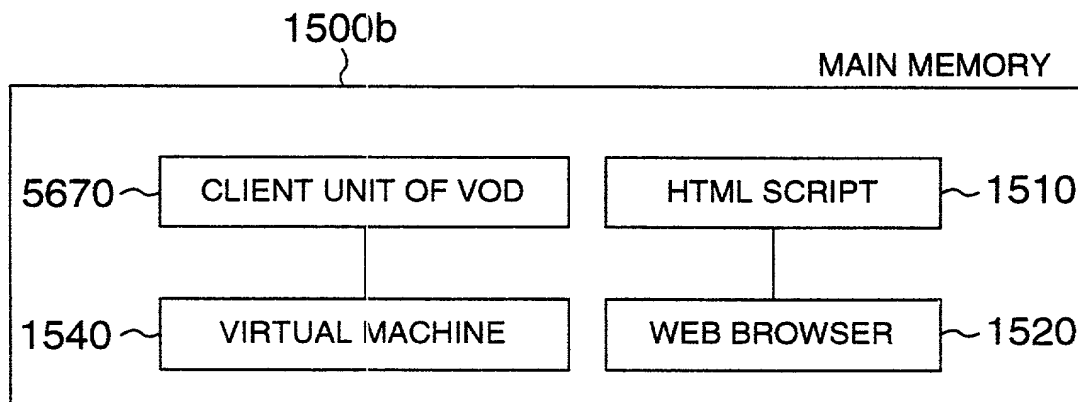


FIG.20

INFORMATION ON VOD SERVER ADDRESSES					
NAMES OF VOD SERVERS		VOD SERVER No.1	VOD SERVER No.2	VOD SERVER No.3	...
ADDRESSES OF VOD SERVERS		10001	10002	10003	
NAME OF VIDEO DATA	SHOES_1	101	201	301	
		TCP	UDP	HTTP	
		MPEG1	MPEG2	MPEG4	
	CAP_2	102	X	302	
		UDP		TCP	
		MPEG1		MPEG4	
	WEAR_3	X	203	303	
			TCP	UDP	
			MPEG1	MPEG2	
	⋮				

5621
5625
5626
5627
5620b

FIG.21

<div> <div>PROTOCOL</div> <div>METHOD OF COMPRESSION</div> </div>	UDP	TCP	HTTP	...
MPEG1	VodApp1	VodApp2	VodApp3	
MPEG2	VodApp4	VodApp5	VodApp6	
JPEG	VodApp7	VodApp8	VodApp9	
⋮				

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COMBINED DECLARATION AND POWER OF ATTORNEY
(宣誓書及び委任状)

E4138-01
(*)
Copy

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name, I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

"A METHOD OF AND AN APPARATUS FOR CONTROLLING A WEB SERVER,
A WEB SERVER CONTROL PROGRAM, AND A STORAGE MEDIUM ON
WHICH THE WEB SERVER CONTROL PROGRAM IS STORED"

the specification of which: (check one) ☒ is attached hereto.

☐ was filed on _____
as Application Serial No. _____
and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended, by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me which is material to patentability in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date earlier than that of the application(s) on which priority is claimed:

Prior Foreign Application(s)	Priority Claimed
<u>09-240852</u> (Number)	<u>Japan</u> (Country)
<u>5 September, 1997</u> (Day/Month/Year Filed)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<u> </u> (Number)	<u> </u> (Country)
<u> </u> (Day/Month/Year Filed)	<input type="checkbox"/> Yes <input type="checkbox"/> No
<u> </u> (Number)	<u> </u> (Country)
<u> </u> (Day/Month/Year Filed)	<input type="checkbox"/> Yes <input type="checkbox"/> No

I hereby claim the benefit under Title 35, United States Code, 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

<u> </u> (Application Serial No.)	<u> </u> (Filing Date)	<u> </u> (Status) (patented, pending, abandoned)
<u> </u> (Application Serial No.)	<u> </u> (Filing Date)	<u> </u> (Status) (patented, pending, abandoned)

I hereby appoint the following attorneys/agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith and with any divisional, continuation, continuation-in-part, reissue or re-examination application with full power of appointment and substitution of associate attorneys and agents, and to receive all patents which may issue thereon: Thomas E. Beall, Jr., Reg. No. 22,410; Michael J. Colitz, Reg. No. 37,010; Joseph D. Dreher, Reg. No. 37,123; Christopher B. Fagan, Reg. No. 22,987; Jude A. Fry, Reg. No. 33,340; John X. Garred, Reg. No. 31,330; Michael E. Hudzinski, Reg. No. 34,135; Jeffrey M. Ketchum, Reg. No. 31,174; Richard M. Klein, Reg. No. 33,000; Thomas E. Kocovsky, Jr., Reg. No. 23,333; Sandra M. Koenig, Reg. No. 33,722; Petar Kraguljac, Reg. No. 33,520; Scott A. McCollister, Reg. No. 33,961; James W. McKee, Reg. No. 26,432; Shrinath Malur, Reg. No. 34,663; John R. Mattingly, Reg. No. 30,293; Richard J. Minnich, Reg. No. 24,175; Jay F. Moldovanyi, Reg. No. 29,673; Philip J. Moy, Reg. No. 31,230; Timothy E. Nauman, Reg. No. 32,233; Sue Ellen Phillips, Reg. No. 32,046; Patrick R. Roche, Reg. No. 29,530; Alan J. Ross, Reg. No. 33,767; Albert P. Sharpe, III, Reg. No. 19,379; Daniel J. Stanger, Reg. No. 32,346; Eric A. Stephenson, Reg. No. 33,321; Mark S. Svat, Reg. No. 34,261; John C. Tiernan, Reg. No. 21,073; John M. Vasuta, Reg. No. 33,353. Address all correspondence to: FAY, SHARPE, BEALL, FAGAN, MINNICH & MCKEE

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I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, Section 1001, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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